6. Lead (Pb)

Lead is emitted into the atmosphere by certain industries such as smelters and battery manufacturers. Airborne lead is associated with particles ranging between 0.1 and 5.0 micrometers in diameter. Particle size and shape are important factors in determining the deposition and suspension of lead in the atmosphere and the retention and absorption of lead into the human lung.

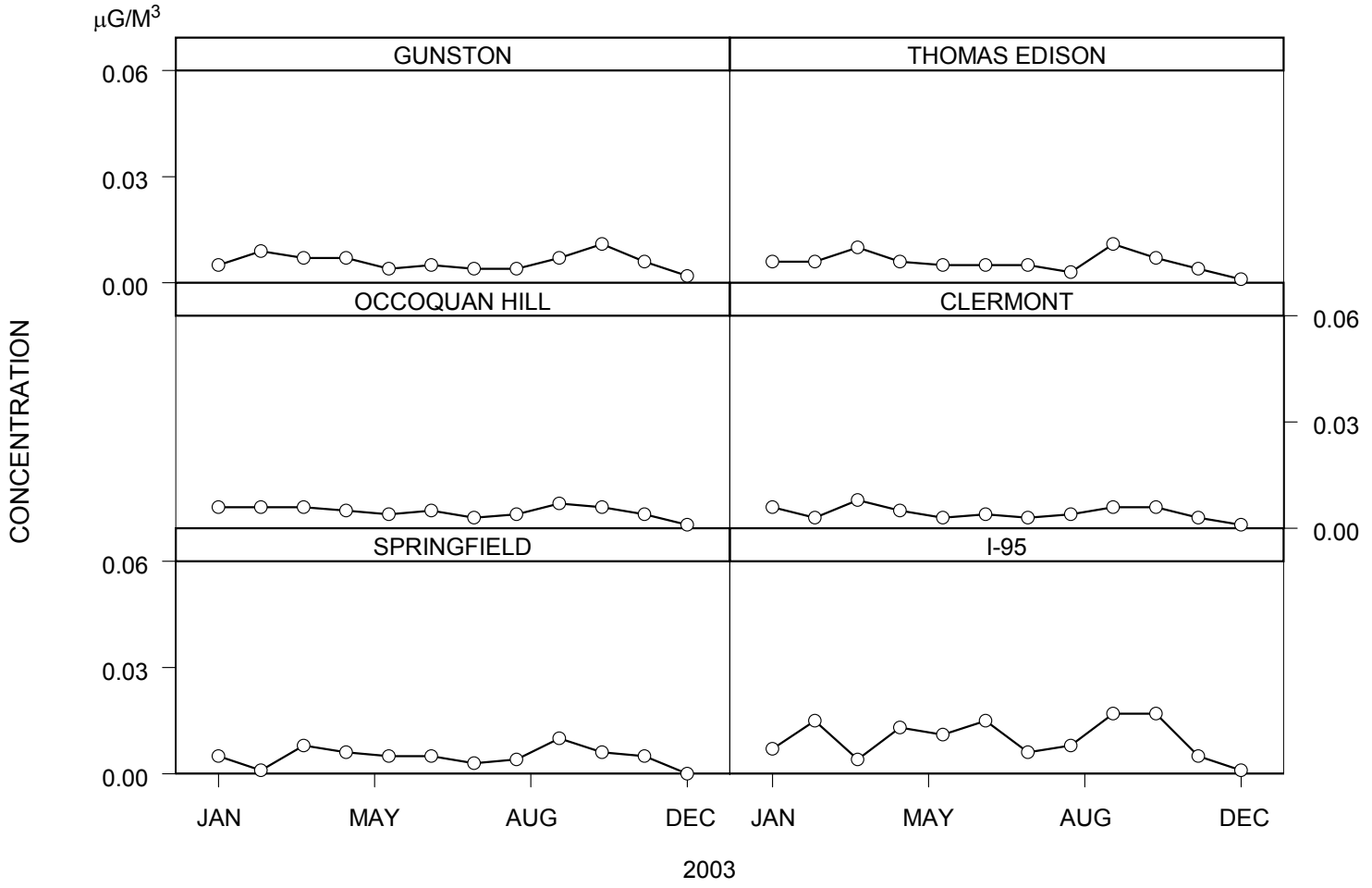
Lead interferes with the blood forming system, the nervous system, the renal system, vitamin D metabolism, and can affect the normal functions of the reproductive and cardiovascular systems. Certain subgroups of the population are more susceptible to the effects of lead. Low levels of lead absorption by young children can cause permanent mental retardation. Lead has also been associated with high blood pressure in adults.

The NAAQS for lead are defined in terms of the quarterly arithmetic mean. The primary and secondary standards for lead are 1.5 $\mu g/m^3$ quarterly arithmetic mean.

Table 11: Lead

	BUSH HILL	CLERMONT	GUNSTON	I-95	OQQOQUAN HILL	SPRINGFIELD	THOMAS EDISON
Number of 24-hr measurements	61	60	60	58	60	61	57
Maximum 24-hr sample, $\mu g/m^3$	0.023	0.015	0.016	0.015	0.014	0.014	0.025
Maximum monthly average, $\mu g/m^3$	0.009	0.007	0.009	0.014	0.008	0.008	0.009
Maximum quarterly average, $\mu g/m^3$	0.009	0.008	0.008	0.014	0.008	0.008	0.010
Maximum quarter, $\mu g/m^3$	0.013	0.011	0.011	0.016	0.009	0.011	0.013

LEAD MONTHLY MEAN



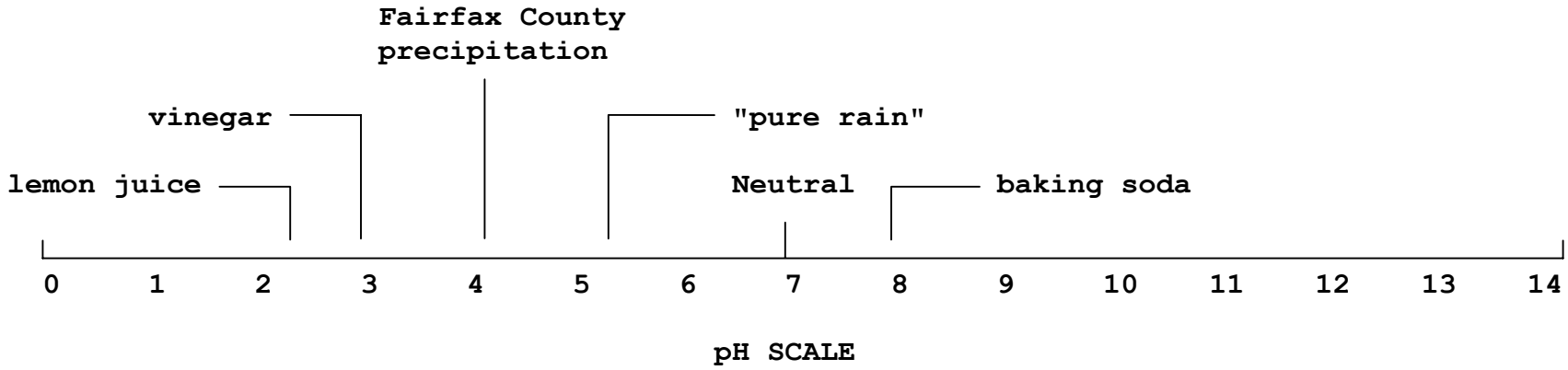
FEDERAL, STATE, AND COUNTY STANDARDS:

PRIMARY: 1.5 µG/M^3 MAXIMUM ARITHMETIC MEAN PER CALENDAR QUARTER.

SECONDARY: SAME AS PRIMARY

D. Acid Deposition

Acidic precipitation is a phenomenon resulting primarily from the reaction of sulfur oxides and nitrogen oxides which in combination with atmospheric oxygen and moisture form sulfuric and nitric acids. These acids can then be deposited by wet deposition (rain, snow, ice, and fog). Rain and snow are the two primary mechanisms of deposition. In the absence of moisture intermediate products, sulfates, nitrates, and other aerosols are formed and deposited in dry form. The amount of acidity in precipitation can be determined by measuring the pH of a sample. pH is based on a logarithmic scale. A pH of 7.0 is neutral, less than 7.0 is acidic, and greater than 7.0 is basic. Since the scale is logarithmic, a pH change from 7.0 to 6.0 is a ten-fold increase in acidity.



In sensitive areas of the country, acidic precipitation has caused acidification of freshwater ecosystems such that aquatic life can no longer survive. Acidic precipitation is also suspected to be a corrosive which can damage statuary, stone structures, and automobile finishes. Direct effects upon humans have not been established.

Rain and snow samples are collected from our monitoring station at Occoquan, Virginia on a weekly basis. The samples are returned to our laboratory in Fairfax and are analyzed for pH and conductivity. The Virginia Consolidated Laboratories (DCLS) conducts further analysis on our samples for cations and anions, and determines the anion-cation balance.

No standards have been established but "pure rain" should have a pH in the range of 5.2 to 5.6 due to its mixing with atmospheric carbon dioxide and other natural atmospheric constituents.

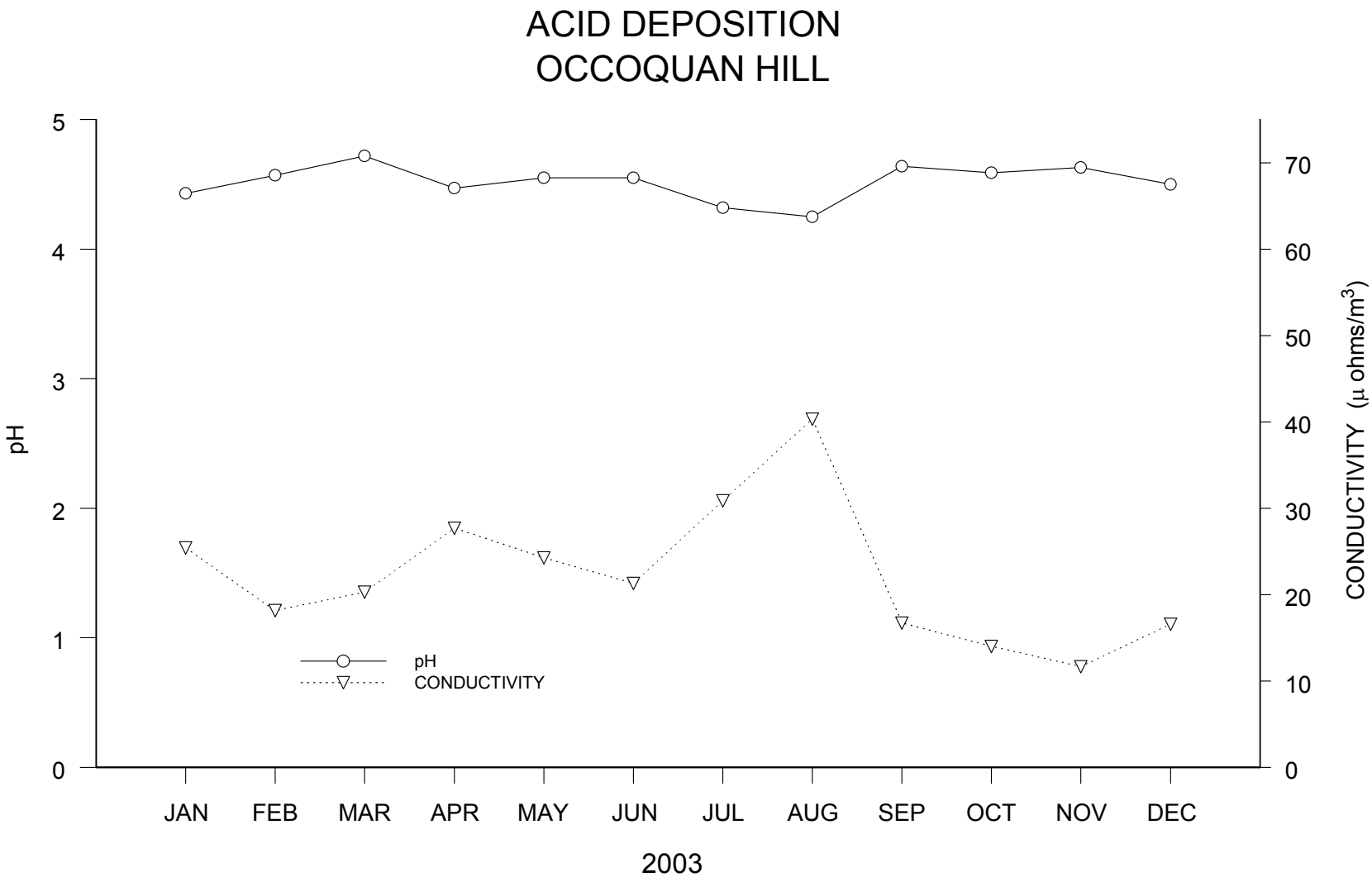
Table 12: Acid Deposition Occoquan Hill Site
Monthly Volumetric Weighted Average

	pH*	CONDUCTIVITY* (μMHO)	TOTAL RAINFALL
January	4.43	25.40	0.59
February	4.57	18.14	1.47
March	4.72	20.28	0.91
April	4.47	27.68	0.75
May	4.55	24.24	1.70
June	4.55	21.29	1.99
July	4.32	30.85	0.74
August	4.25	40.33	0.47
September	4.64	16.70	1.50
October	4.59	14.00	0.72
November	4.63	11.65	1.28
December	4.50	16.57	1.15

Table 13: Acid Deposition Occoquan Hill Site
Quarterly and Annual Volumetric Weighted Average

	pH*	CONDUCTIVITY* (μMHO)
First Quarter	4.59	20.36
Second Quarter	4.53	23.67
Third Quarter	4.50	23.48
Fourth Quarter	4.57	14.20
Annual 2003	4.55	20.66

* Volume weighted average indicates what the level would be if all samples had been mixed together.



ph and Conductivity monthly values are volume weighted averages.

Acid rain sampler at Occoquan Hill monitoring station

E. Regional Air Quality

1. Air Quality Index

The U.S. Environmental Protection Agency (EPA) requires the use of an Air Quality Index (AQI) for reporting air quality levels to the general public. The AQI is a system which condenses five air pollutant concentration values (PM_{10}, SO_2, CO, O_3, and NO_2) into a single number as an indicator of air quality. The index values are then grouped into air quality descriptor categories as shown in Table 14. The EPA adopted changes to this index, formerly named the Pollutant Standards Index (PSI), which became effective October 4, 1999. Some of the changes to this index are the addition of another descriptor category for "unhealthy for sensitive groups", new breakpoints for the ozone sub-index in terms of 8-hour, and reporting this index in a color format to the public.

Table 14: Air Quality Index

Index Value	Descriptor Category	Color
0-50	Good	Green
51-100	Moderate	Yellow
101-150	Unhealthy for sensitive groups	Orange
151-200	Unhealthy	Red
201-300	Very unhealthy	Purple
>300	Hazardous	Maroon

The Metropolitan Washington Council of Governments (COG) is responsible for reporting daily air quality levels to the public in this region. COG collects air quality data from selected monitoring stations on a daily basis, calculates a maximum index value and forecasts the air quality levels for the following day, and reports this by color format to the media for dissemination to the public. During regional air pollution advisories, COG collects hourly air quality data from these monitoring stations throughout the region as a basis for continuing or canceling the advisory. When the index exceeds or will probably exceed 100, and when specific weather conditions exist, a Health Advisory may be issued by COG. This Health Advisory is directed towards sensitive populations such as the elderly and those with respiratory disorders. There were 2 Code Red Days and 2 Code Orange Days announced by COG during 2003.

2. Regional Ozone Exceedances

In April 2004 the metropolitan Washington region, including Washington, DC, Maryland, and Virginia was classified by EPA as moderate non-attainment of the 8-hour ozone National Ambient Air Quality Standard (NAAQS). The metropolitan Washington region has until June 2007 to submit a State Implementation Plan with effective ozone reduction actions that will lead the region to compliance with the 8-hour ozone standard. The region must demonstrate compliance by June 2010. The 1-hour ozone standard is being phased out in 2004.

During 2003, the 1-hour ozone standard was still in effect for the metropolitan Washington region. On January 24, 2003, EPA reclassified the metropolitan Washington region to severe non-attainment for the 1-hour ozone standard. In 2003, an exceedant day was a day when an ozone monitoring site exceeded the 1-hour NAAQS of 0.12 ppm for at least one hour. There were three 1-hour ozone exceedant days in the metropolitan Washington region in 2003. The region has a total of 18 monitoring sites. Fairfax County had two ozone exceedant days in 2003. The details are shown in Table 15a.

Violations of the 8-hour standard are shown in Table 15b. The metropolitan Washington region had seven 8-hour exceedances in 2003, while Fairfax County had five 8-hour exceedances in 2003.

TABLE 15a: REGIONAL OZONE EXCEEDANCES 1-HOUR AVERAGE

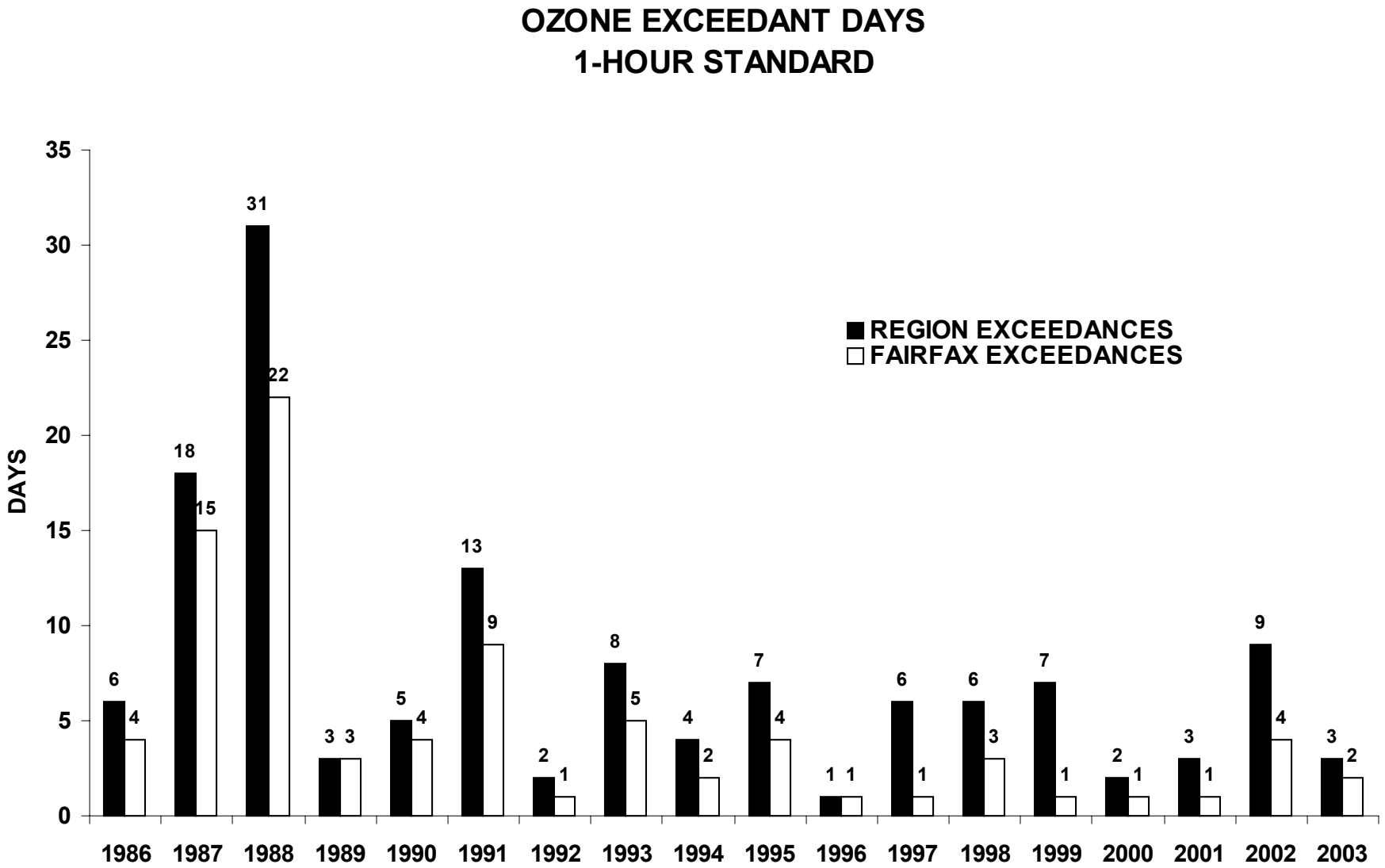
DATE	LOCATION	MAXIMUM 1 HOUR OZONE (ppm)
June 25, 2003	P.G. Equestrian Center	0.141
	Franconia*	0.137
	Southern Maryland	0.133
	Mount Vernon*	0.132
	Mason*	0.130
	Arlington	0.126
	Rockville	0.125
June 26, 2003	P.G. Equestrian Center	0.141
August 14, 2003	Mount Vernon	0.127

*Station located in Fairfax County

TABLE 15b: REGIONAL OZONE EXCEEDANCES 8-HOUR AVERAGE

DATE	NUMBER OF STATIONS THAT EXCEEDED THE STANDARD	MAX VALUE IN METROPOLITAN WASHINGTON REGION (ppm)
June 24, 2003	13	.107
June 25, 2003	17	.125
June 26, 2003	16	.126
June 30, 2003	4	.100
Aug 14, 2003	4	.095
Aug 22, 2003	1	.085
Aug 28, 2003	1	.086

The following graph depicts the number of ozone exceedant days observed in the metropolitan Washington region which includes Fairfax County compared to the number of ozone exceedant days in Fairfax County.



F. METEOROLOGY

1. Overview

Pertinent and representative localized meteorological data are an essential and ongoing integral part of the County's air quality monitoring program. Continuous and accurate observations of local conditions relating to temperature, wind flow and precipitation are fundamental elements used in the day to day evaluation and understanding of air quality conditions and assessment of long-term trends within the County.

The County's meteorological observing equipment has evolved from simple battery powered, mechanical recorder devices requiring manual reduction of data to more modern electronic sensors and data average devices capable of real-time call up and output of instantaneous values or hourly and daily averages of temperature, wind and precipitation. The meteorological sensors are employed in close proximity with the air quality monitors to assure representative data.

Some meteorological data produced by other agencies at nearby locations are acquired and used by the agency. Data from Dulles and Washington National Airports, although tailored for aviation support, are particularly useful in establishing long term averages, for quality control work, and to compliment agency data. Therefore, some of the pertinent airport data are tabulated and displayed in this report.

County and agency computers, data loggers, and other electronic devices are exploited in the acquisition, reduction and processing of meteorological data. For this report, the data, unless otherwise described, is processed, tabulated and displayed in a manner similar to that done for the air quality pollutant data. If you want to see additional meteorological data, please visit the National Weather Service Forecast web page for the Baltimore and Washington region which is located at www.nws.noaa.gov/er/lwx/climate.htm.

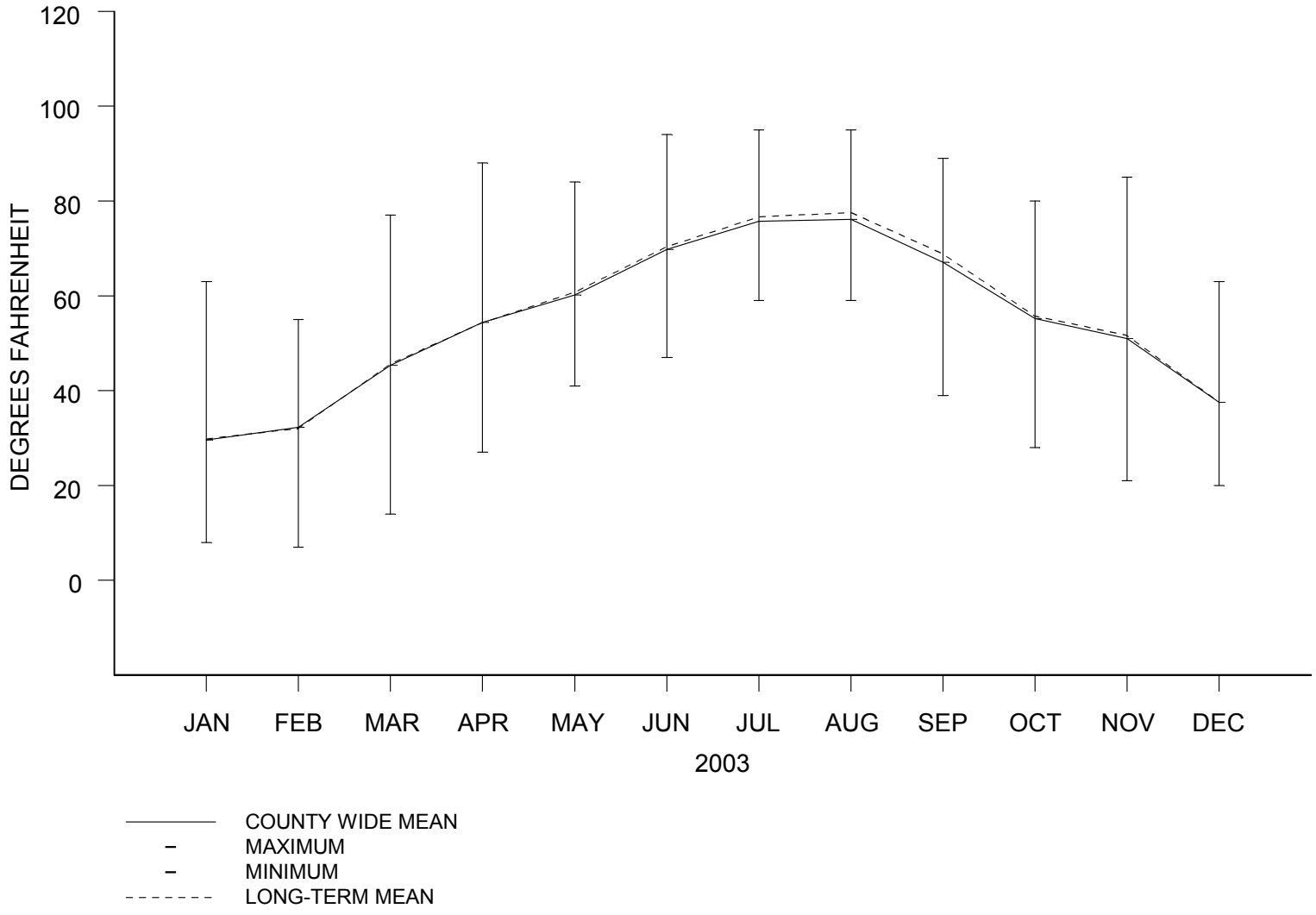
2. Temperature

The annual average maximum or minimum temperature is obtained by averaging all daily maximum or minimum temperatures. The annual mean value is the average of all hourly average temperature observations, and is independent of any recorded or calculated maximum or minimum.

Table 16: Temperature

	Annual Mean Temperature °F	Annual Average Daily Maximum °F	Annual Average Daily Minimum °F
	Mean	Maximum	Minimum
COUNTY STATIONS			
Lewinsville	55.3	79.2	36.4
Mount Vernon	55.1	79.2	35.5
Mason	53.1	75.8	35.4
Occoquan Hill	55.2	78.8	35.8
Luck Quarry	53.9	79.9	30.5
AIRPORTS			
Dulles	53.6	78.1	30.0
National	56.4	78.8	37.3

MONTHLY MEAN TEMPERATURE
WITH MAXIMUM AND MINIMUM DAILY EXTREMES



3. Rainfall

Rainfall is stated as the accumulated depth in inches as measured by county and airport rain gauges. Rainfall was below normal in 2003.

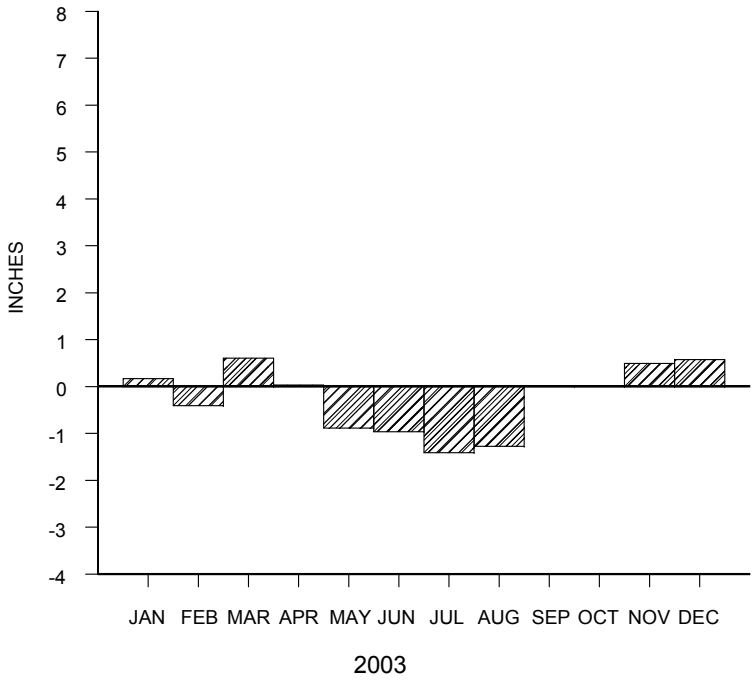
Table 17: Rainfall

	RAINFALL (inches)
COUNTY STATIONS	
Lewinsville	*
Mount Vernon	60.70
Mason	63.22
Occoquan Hill	57.21
Luck Quarry	*
AIRPORTS	
Dulles	65.73
National	60.83
ANNUAL COUNTYWIDE MEAN	60.38
LONG TERM MEAN FROM TWO AIRPORT SITES	63.28

* Not enough valid data to get annual values due to instrument malfunction.

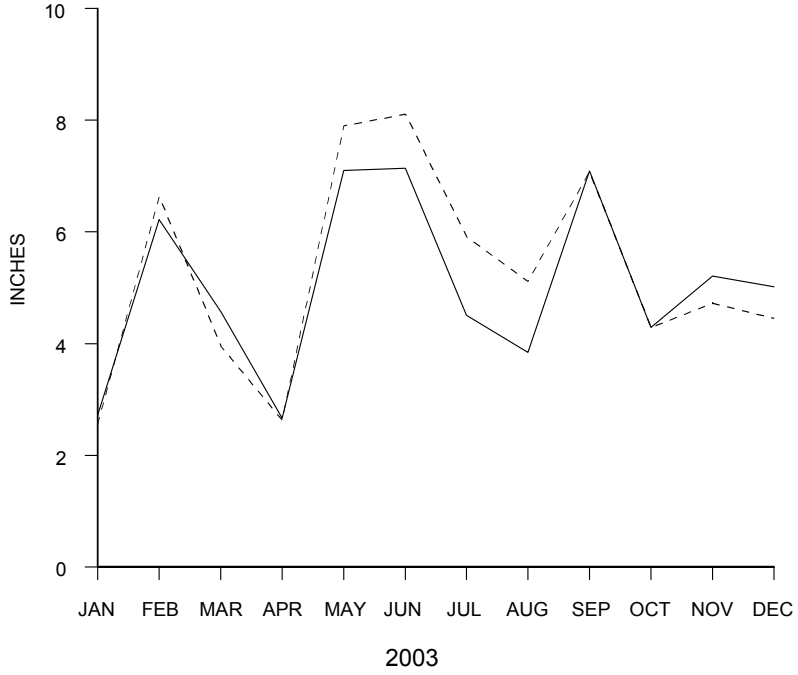
RAINFALL

DEPARTURE



DEPARTURE: THE DIFFERENCE BETWEEN THE LONG TERM 2 AIRPORT AVERAGE AND THE AVERAGE OF THE OBSERVED AMOUNTS AT ALL STATIONS.

DEPTH



Weather station at Occoquan Hill

Rain gauge sampler